Gunter, Jason

From: Nations, Mark [mnations@doerun.com]
Sent: Monday, May 13, 2013 2:25 PM
To: Gunter, Jason
Cc: England, Jason; Yingling, Mark; Wohl, Matthew; robert.hinkson@dnr.mo.gov; Ty Morris (TMorris@barr.com)
Subject: Rivermines Progress Report
Attachments: Rivermines NPDES Samples_04-03-13.pdf; 20130510163458880.pdf; RM 0-13.doc

Jason,
Attached is the April Rivermines Progress Report.
Mark

THE DOE RUN COMPANY

Remediation Group

Mark Nations
Mining Properties Manager
mnations@doerun.com

May 13, 2013

Mr. Jason Gunter
Remedial Project Manager
U.S. Environmental Protection Agency
Region 7 - Superfund Branch
11201 Renner Blvd.
Lenexa, KS 66219

Re: The Doe Run Company – Elvins/Rivermines Mine Tailings Site Monthly Progress Report

Dear Mr. Gunter:

As required by Article VI, Section 56 of the Unilateral Administrative Order (UAO) (CERCLA-07-2005-0169) for the referenced project and on behalf of The Doe Run Company, the progress report for the period April 1, 2013 through April 30, 2013 is enclosed. If you have any questions or comments, please call me at 573-518-0800.

Sincerely,

Mark Nations
Mining Properties Manager

Enclosures
c: Jason England – TDRC
Mark Yingling – TDRC (electronic only)
Matt Wohl – TDRC (electronic only)
Robert Hinkson – MDNR
Ty Morris – Barr Engineering

Elvins/Rivermines Mine Tailings Site
Park Hills, Missouri
Removal Action - Monthly Progress Report
Period: March 1, 2013 – March 31, 2013

1. **Actions Performed and Problems Encountered This Period:**
a) Continued operating the roughing filter, ZVI filter, aeration tank, and final sand filter during the period.
b) A portion of the sand in the final sand filter was again removed on at least one occasion during the period. This was done to alleviate high water depths in the round tank. At the end of the period, approximately 10% the originally placed sand remained. By the end of the period, the plugging issues with the final sand filter seem to have been resolved.
c) Flow restrictions and head losses caused the roughing filter to overflow during the period. Due to influent plugging of the ZVI filter inlet or inlet pipe, additional head loss in the inlet pipe/structure caused the water level in the Roughing filter (biofilter) to rise and overflow the pool sides.
d) Continued to take analytical samples from the pilot test two to three times a week. Samples were taken from the roughing filter (RMP-Rough), the aeration tank (RMP-Polish), and the final sand filter (RMP-Effluent).
e) Continued to take analytical samples from the seep pond effluent and the western treatment pond effluent to monitor the metals reduction of the treatment pond.
f) Restrictions in the 6-inch diameter pipe leading from the seepage pond to the west treatment cell caused water to leak from the seepage pond manhole. Scouring of the surrounding soil occurred from this leaking. Measurements, calculations, and onsite investigation indicate debris may be present inside the pipe near the up gradient end of the pipe. Flow to the east treatment cell was restored to temporarily alleviate the issue of leaking from the manhole. Investigation into the cause of the restriction in the west pond pipe identified a turtle shell in the pipe, which was removed. This action improved the flow, however, it did not completely relieve the flow restriction. It is anticipated that additional investigation will be conducted in May.

2. **Analytical Data and Results Received This Period:**

a. a) Dissolved zinc concentrations in the polishing filter effluent ranged between 4.48 mg/L and 9.95 mg/L during the period.

b. b) Total zinc concentrations in the polishing filter ranged between 4.80 mg/L and 9.11 mg/L during the period.

c. c) Total iron concentrations in the polishing filter ranged between 0.45 mg/L and 3.60 mg/L during the period.

d. d) Total suspended solids concentrations in the polishing filter effluent ranged between non-detect and 8.0 mg/L during the period.

e. e) During this period, water samples were collected from just upstream of Old Missouri Highway 32, as well as from upstream and downstream of the confluence of the site discharge with Flat River. The analytical results for this event are included in this progress report.

The January 2013 Ambient Air Monitoring Report noted the following:

- The action levels for lead and dust were not exceeded.
- No samples were taken with the TSP and PM10 monitors 01/01/13 due to the holiday.
- The sample for National #1 (Ozark Insulation) TSP monitor on 01/10/13 was invalid. A cause for the sample being invalid was never identified.

- The sample for Rivermines #1 (Office) TSP monitor on 01/22/13 was invalid due to a mechanical failure. Upon discovering the mechanical failure, the issue was addressed.

- The sample for Big River #4 (QA) TSP monitor on 01/24/13 was invalid due to a mechanical failure. Upon discovering the mechanical failure, the issue was addressed.

3. Developments Anticipated and Work Scheduled for Next Period:

a) Continue analytical sampling and field measurements three times a week. No WET tests are planned.

b) Continue to operate the renovated pilot test.

c) Complete monthly water sampling activities as described in the Removal Action Work Plan.

d) Complete air monitoring activities as described in the Removal Action Work Plan.

e) Continue monitoring the western treatment pond to see that the hydraulics are working properly and evaluate the metals reduction as the pond continues to come online.

f) Further investigate issues that pertain to the leaking of water from the seepage pond manhole. If required, remove any debris located in the pipe between the manhole and the west treatment cell. It is anticipated that a pipe cleaning contractor will be needed to investigate and remove the obstruction in the west pond piping.

g) Pending successful removal of the west pond obstructions, initial phases of cleanout of the old media in the east pond may begin in late May.

4. Changes in Personnel:

a. None.

5. Issues or Problems Arising This Period:

a. None.

6. Resolution of Issues or Problems Arising This Period:

a. None.

End of Monthly Progress Report

April 15, 2013

Allison Olds
Barr Engineering Company
1001 Diamond Ridge
Suite 1100
Jefferson City, MO 65109
TEL: (573) 638-5007
FAX: (573) 638-5001

RE: Rivermines NPDES **WorkOrder:** 13040247

Dear Allison Olds:

TEKLAB, INC received 4 samples on 4/4/2013 8:00:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Michael L. Austin
Project Manager
(618)344-1004 ex 16
MAustin@teklabinc.com

Report Contents

Client: Barr Engineering Company
Client Project: Rivermines NPDES

Work Order: 13040247
Report Date: 15-Apr-13

This reporting package includes the following:

Client: Barr Engineering Company
Work Order: 13040247
Client Project: Rivermines NPDES
Report Date: 15-Apr-13

Abbr Definition

CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.
DNI	Did not ignite
DUP	Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MB	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

- # - Unknown hydrocarbon
- B - Analyte detected in associated Method Blank
- E - Value above quantitation range
- H - Holding times exceeded
- M - Manual Integration used to determine area response
- ND - Not Detected at the Reporting Limit
- R - RPD outside accepted recovery limits
- S - Spike Recovery outside recovery limits
- X - Value exceeds Maximum Contaminant Level

Client: Barr Engineering Company
Client Project: Rivermines NPDES

Work Order: 13040247
Report Date: 15-Apr-13

Cooler Receipt Temp: 1.8 °C

Locations and Accreditations

Collinsville		Springfield		Kansas City	
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	Address	3920 Pintail Dr Springfield, IL 62711-9415	Address	8421 Nieman Road Lenexa, KS 66214
Phone	(618) 344-1004	Phone	(217) 698-1004	Phone	(913) 541-1998
Fax	(618) 344-1005	Fax	(217) 698-1005	Fax	(913) 541-1998
Email	jhriley@teklabinc.com	Email	KKlostermann@teklabinc.com	Email	dthompson@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2014	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2014	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2013	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2013	Springfield
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2013	Collinsville
Arkansas	ADEQ	88-0966		3/14/2014	Collinsville
Illinois	IDPH	17584		4/30/2013	Collinsville
Kentucky	UST	0073		4/5/2014	Collinsville
Missouri	MDNR	00930		4/13/2013	Collinsville
Oklahoma	ODEQ	9978		8/31/2013	Collinsville

Client: Barr Engineering Company
Work Order: 13040247
Client Project: Rivermines NPDES
Report Date: 15-Apr-13
Lab ID: 13040247-001
Client Sample ID: RM-001
Matrix: SURFACE WATER
Collection Date: 04/03/2013 12:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	500		**1240**	mg/L	50	04/04/2013 13:50	R175513
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		**7.42**		1	04/08/2013 17:00	R175654
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		**< 6**	mg/L	1	04/04/2013 13:58	R175517
STANDARD METHODS 2540 F								
Solids, Settleable	NELAP	0.1		**< 0.1**	ml/L	1	04/04/2013 11:35	R175507
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		**1.4**	mg/L	1	04/04/2013 16:30	R175536
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		**5.70**	µg/L	1	04/05/2013 1:30	87063
Zinc	NELAP	10.0		**17600**	µg/L	1	04/05/2013 1:30	87063
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	4.00		**12.6**	µg/L	2	04/05/2013 21:32	87055
Zinc	NELAP	20.0	S	**19200**	µg/L	2	04/05/2013 21:32	87055
MS QC limits for Ca, Mg, and Zn are not applicable due to high sample/spike ratio.								
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00	X	**12.8**	µg/L	1	04/07/2013 13:53	87056
STANDARD METHODS 2340 B, HARDNESS (TOTAL)								
Hardness, as (CaCO3)	NELAP	1.00		**1140**	mg/L	1	04/05/2013 0:00	R175589
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00		**2.87**	µg/L	1	04/07/2013 11:13	87062

Client: Barr Engineering Company
Work Order: 13040247
Client Project: Rivermines NPDES
Report Date: 15-Apr-13
Lab ID: 13040247-002
Client Sample ID: RM-US
Matrix: SURFACE WATER
Collection Date: 04/03/2013 13:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**22**	mg/L	1	04/04/2013 13:56	R175513
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		**8.30**		1	04/08/2013 17:00	R175654
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		**< 6**	mg/L	1	04/04/2013 13:58	R175517
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		**1.7**	mg/L	1	04/04/2013 16:37	R175536
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	04/05/2013 1:36	87063
Zinc	NELAP	10.0		**< 10.0**	µg/L	1	04/05/2013 1:36	87063
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	04/05/2013 21:50	87055
Zinc	NELAP	10.0		**< 10.0**	µg/L	1	04/05/2013 21:50	87055
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00		**< 2.00**	µg/L	1	04/07/2013 13:57	87056
STANDARD METHODS 2340 B, HARDNESS (TOTAL)								
Hardness, as (CaCO3)	NELAP	1.00		**132**	mg/L	1	04/05/2013 0:00	R175589
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00		**< 2.00**	µg/L	1	04/07/2013 11:30	87062

Client: Barr Engineering Company
Work Order: 13040247
Client Project: Rivermines NPDES
Report Date: 15-Apr-13
Lab ID: 13040247-003
Client Sample ID: RM-DS
Matrix: SURFACE WATER
Collection Date: 04/03/2013 11:40

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	20		**48**	mg/L	2	04/04/2013 14:14	R175513
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		**7.92**		1	04/08/2013 17:00	R175654
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		**58**	mg/L	1	04/04/2013 13:58	R175517
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		**1.9**	mg/L	1	04/04/2013 16:49	R175536
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	04/05/2013 1:55	87063
Zinc	NELAP	10.0		**350**	µg/L	1	04/05/2013 1:55	87063
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	04/05/2013 21:54	87055
Zinc	NELAP	10.0		**792**	µg/L	1	04/05/2013 21:54	87055
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	20.0	X	**221**	µg/L	10	04/10/2013 10:29	87056
STANDARD METHODS 2340 B, HARDNESS (TOTAL)								
Hardness, as (CaCO3)	NELAP	1.00		**168**	mg/L	1	04/05/2013 0:00	R175589
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00	X	**5.70**	µg/L	1	04/07/2013 11:33	87062

Client: Barr Engineering Company
Work Order: 13040247
Client Project: Rivermines NPDES
Report Date: 15-Apr-13
Lab ID: 13040247-004
Client Sample ID: RM-DUP
Matrix: SURFACE WATER
Collection Date: 04/03/2013 0:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	20		**51**	mg/L	2	04/08/2013 15:14	R175639
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		**7.89**		1	04/05/2013 21:25	R175587
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		**59**	mg/L	1	04/04/2013 13:58	R175517
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		**1.9**	mg/L	1	04/04/2013 16:55	R175536
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	04/05/2013 2:01	87063
Zinc	NELAP	10.0		**354**	µg/L	1	04/05/2013 2:01	87063
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		**< 2.00**	µg/L	1	04/05/2013 21:58	87055
Zinc	NELAP	10.0		**807**	µg/L	1	04/05/2013 21:58	87055
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	20.0	X	**222**	µg/L	10	04/10/2013 10:32	87056
STANDARD METHODS 2340 B, HARDNESS (TOTAL)								
Hardness, as (CaCO3)	NELAP	1.00		**167**	mg/L	1	04/05/2013 0:00	R175589
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00	X	**5.60**	µg/L	1	04/07/2013 11:36	87062

Client: Barr Engineering Company
Work Order: 13040247
Client Project: Rivermines NPDES
Report Date: 15-Apr-13

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
13040247-001	RM-001	Surface Water	5	04/03/2013 12:05
13040247-002	RM-US	Surface Water	5	04/03/2013 13:00
13040247-003	RM-DS	Surface Water	5	04/03/2013 11:40
13040247-004	RM-DUP	Surface Water	5	04/03/2013 0:00

Client: Barr Engineering Company
Client Project: Rivermines NPDES

Work Order: 13040247
Report Date: 15-Apr-13

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			Prep Date/Time	Analysis Date/Time
13040247-001A	RM-001	04/03/2013 12:05	04/04/2013 8:00		
	Standard Methods 2540 F				04/04/2013 11:35
13040247-001B	RM-001	04/03/2013 12:05	04/04/2013 8:00		
	EPA 600 375.2 Rev 2.0 1993 (Total)				04/04/2013 13:50
	Standard Method 4500-H B, Laboratory Analyzed				04/08/2013 17:00
	Standard Methods 2540 D				04/04/2013 13:58
13040247-001C	RM-001	04/03/2013 12:05	04/04/2013 8:00		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			04/04/2013 10:34	04/05/2013 21:32
	Standard Methods 3030 E, 3113 B, Metals by GFAA			04/04/2013 10:39	04/07/2013 13:53
	Standard Methods 2340 B, Hardness (Total)				04/05/2013 0:00
13040247-001D	RM-001	04/03/2013 12:05	04/04/2013 8:00		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			04/04/2013 11:18	04/05/2013 1:30
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			04/04/2013 11:15	04/07/2013 11:13
13040247-001E	RM-001	04/03/2013 12:05	04/04/2013 8:00		
	Standard Methods 5310 C, Organic Carbon				04/04/2013 16:30
13040247-002A	RM-US	04/03/2013 13:00	04/04/2013 8:00		
	Standard Methods 2540 D				04/04/2013 13:58
13040247-002B	RM-US	04/03/2013 13:00	04/04/2013 8:00		
	EPA 600 375.2 Rev 2.0 1993 (Total)				04/04/2013 13:56
	Standard Method 4500-H B, Laboratory Analyzed				04/08/2013 17:00
13040247-002C	RM-US	04/03/2013 13:00	04/04/2013 8:00		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			04/04/2013 10:34	04/05/2013 21:50
	Standard Methods 3030 E, 3113 B, Metals by GFAA			04/04/2013 10:39	04/07/2013 13:57
	Standard Methods 2340 B, Hardness (Total)				04/05/2013 0:00
13040247-002D	RM-US	04/03/2013 13:00	04/04/2013 8:00		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			04/04/2013 11:18	04/05/2013 1:36
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			04/04/2013 11:15	04/07/2013 11:30
13040247-002E	RM-US	04/03/2013 13:00	04/04/2013 8:00		
	Standard Methods 5310 C, Organic Carbon				04/04/2013 16:37
13040247-003A	RM-DS	04/03/2013 11:40	04/04/2013 8:00		
	Standard Methods 2540 D				04/04/2013 13:58
13040247-003B	RM-DS	04/03/2013 11:40	04/04/2013 8:00		
	EPA 600 375.2 Rev 2.0 1993 (Total)				04/04/2013 14:14
	Standard Method 4500-H B, Laboratory Analyzed				04/08/2013 17:00
13040247-003C	RM-DS	04/03/2013 11:40	04/04/2013 8:00		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			04/04/2013 10:34	04/05/2013 21:54

Client: Barr Engineering Company
Client Project: Rivermines NPDES

Work Order: 13040247
Report Date: 15-Apr-13

Sample ID	Client Sample ID	Collection Date	Received Date		
	Test Name			**Prep Date/Time**	**Analysis Date/Time**
	Standard Methods 3030 E, 3113 B, Metals by GFAA			04/04/2013 10:39	04/10/2013 10:29
	Standard Methods 2340 B, Hardness (Total)				04/05/2013 0:00
13040247-003D	RM-DS	04/03/2013 11:40	04/04/2013 8:00		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			04/04/2013 11:18	04/05/2013 1:55
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			04/04/2013 11:15	04/07/2013 11:33
13040247-003E	RM-DS	04/03/2013 11:40	04/04/2013 8:00		
	Standard Methods 5310 C, Organic Carbon				04/04/2013 16:49
13040247-004A	RM-DUP	04/03/2013 0:00	04/04/2013 8:00		
	Standard Methods 2540 D				04/04/2013 13:58
13040247-004B	RM-DUP	04/03/2013 0:00	04/04/2013 8:00		
	EPA 600 375.2 Rev 2.0 1993 (Total)				04/08/2013 15:14
	Standard Method 4500-H B, Laboratory Analyzed				04/05/2013 21:25
13040247-004C	RM-DUP	04/03/2013 0:00	04/04/2013 8:00		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			04/04/2013 10:34	04/05/2013 21:58
	Standard Methods 3030 E, 3113 B, Metals by GFAA			04/04/2013 10:39	04/10/2013 10:32
	Standard Methods 2340 B, Hardness (Total)				04/05/2013 0:00
13040247-004D	RM-DUP	04/03/2013 0:00	04/04/2013 8:00		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			04/04/2013 11:18	04/05/2013 2:01
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			04/04/2013 11:15	04/07/2013 11:36
13040247-004E	RM-DUP	04/03/2013 0:00	04/04/2013 8:00		
	Standard Methods 5310 C, Organic Carbon				04/04/2013 16:55

Client: Barr Engineering Company

Client Project: Rivermines NPDES

Work Order: 13040247

Report Date: 15-Apr-13

EPA 600 375.2 REV 2.0 1993 (TOTAL)

Batch R175513 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						04/04/2013

Batch R175513 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**19**	20	0	93.2	90	110	04/04/2013

Batch R175597 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						04/05/2013

Batch R175597 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**21**	20	0	104.6	90	110	04/05/2013

Batch R175639 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**< 10**						04/08/2013

Batch R175639 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	10		**20**	20	0	100.5	90	110	04/08/2013

Batch R175639 **SampType:** MS Units **mg/L**
SampID: 13040247-004BMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	20		**70**	20	51.08	93.8	90	110	04/08/2013

Batch R175639 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 13040247-004BMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate	20		**71**	20	51.08	99.2	69.83	1.55	04/08/2013

Client: Barr Engineering Company
Work Order: 13040247
Client Project: Rivermines NPDES
Report Date: 15-Apr-13

STANDARD METHOD 4500-H B, LABORATORY ANALYZED

Batch R175587 **SampType:** LCS Units
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab pH	1.00		**6.99**	7.00	0	99.9	99.1	100.8	04/05/2013

Batch R175587 **SampType:** DUP Units RPD Limit **10**
SampID: 13040247-004B

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1.00		**7.93**				7.890	0.51	04/05/2013

Batch R175654 **SampType:** LCS Units
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab pH	1.00		**7.01**	7.00	0	100.1	99.1	100.8	04/08/2013

Batch R175654 **SampType:** DUP Units RPD Limit **10**
SampID: 13040247-001B

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1.00		**7.44**				7.420	0.27	04/08/2013

Batch R175654 **SampType:** DUP Units RPD Limit **10**
SampID: 13040247-002B

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1.00		**8.30**				8.300	0.00	04/08/2013

Batch R175654 **SampType:** DUP Units RPD Limit **10**
SampID: 13040247-003B

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab pH	1.00		**7.92**				7.920	0.00	04/08/2013

STANDARD METHODS 2540 D

Batch R175517 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Suspended Solids	6		**< 6**						04/04/2013

Batch R175517 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Suspended Solids	6		**94**	100	0	94.0	85	115	04/04/2013
Total Suspended Solids	6		**105**	100	0	105.0	85	115	04/04/2013
Total Suspended Solids	6		**93**	100	0	93.0	85	115	04/04/2013
Total Suspended Solids	6		**103**	100	0	103.0	85	115	04/04/2013

Client: Barr Engineering Company

Client Project: Rivermines NPDES

Work Order: 13040247

Report Date: 15-Apr-13

STANDARD METHODS 2540 D

Batch R175517 **SampType:** DUP Units **mg/L** RPD Limit **15**

SampID: 13040247-002A-DUP

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Suspended Solids	6		**< 6**				0	0.00	04/04/2013

STANDARD METHODS 5310 C, ORGANIC CARBON

Batch R175536 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	1.0		**< 1.0**						04/04/2013

Batch R175536 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	10.0		**64.5**	59.7	0	108.0	90	110	04/04/2013

Batch R175536 **SampType:** MS Units **mg/L**

SampID: 13040247-004EMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)	1.0		**6.6**	5.0	1.900	93.8	85	115	04/04/2013

Batch R175536 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 13040247-004EMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Organic Carbon (TOC)	1.0		**6.6**	5.0	1.900	93.2	6.590	0.46	04/04/2013

EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)

Batch 87063 **SampType:** MBLK Units **µg/L**

SampID: MBLK-87063

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**< 2.00**	2.00	0	0	-100	100	04/04/2013
Zinc	10.0		**< 10.0**	10.0	0	0	-100	100	04/04/2013

Batch 87063 **SampType:** LCS Units **µg/L**

SampID: LCS-87063

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**45.9**	50.0	0	91.8	85	115	04/04/2013
Zinc	10.0		**447**	500	0	89.4	85	115	04/04/2013

Batch 87063 **SampType:** MS Units **µg/L**

SampID: 13040247-002DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**45.3**	50.0	0	90.6	75	125	04/05/2013
Zinc	10.0		**449**	500	4.3	88.9	75	125	04/05/2013

Client: Barr Engineering Company **Work Order:** 13040247

Client Project: Rivermines NPDES **Report Date:** 15-Apr-13

EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)

Batch 87063 **SampType:** MSD Units µg/L RPD Limit 20

SampID: 13040247-002DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cadmium	2.00		**45.8**	50.0	0	91.6	45.3	1.10	04/05/2013
Zinc	10.0		**451**	500	4.3	89.3	448.8	0.49	04/05/2013

EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)

Batch 87055 **SampType:** MBLK Units µg/L

SampID: MBLK-87055

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**< 2.00**	2.00	0	0	-100	100	04/05/2013
Calcium	50.0		**< 50.0**	50.0	0	0	-100	100	04/05/2013
Magnesium	10.0		**< 10.0**	10.0	0	0	-100	100	04/05/2013
Zinc	10.0		**< 10.0**	10.0	0	0	-100	100	04/05/2013

Batch 87055 **SampType:** LCS Units µg/L

SampID: LCS-87055

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	2.00		**50.9**	50.0	0	101.8	85	115	04/05/2013
Calcium	50.0		**1340**	1200	0	111.6	85	115	04/08/2013
Magnesium	10.0		**802**	750	0	106.9	85	115	04/05/2013
Zinc	10.0		**492**	500	0	98.4	85	115	04/05/2013

Batch 87055 **SampType:** MS Units µg/L

SampID: 13040247-001CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cadmium	4.00		**62.0**	50.0	12.6	98.8	75	125	04/05/2013
Calcium	100	S	**327000**	1200	327800	-66.7	75	125	04/05/2013
Magnesium	20.0	S	**76800**	750	76980	-29.3	75	125	04/05/2013
Zinc	20.0	S	**19400**	500	19212	31.2	75	125	04/05/2013

Batch 87055 **SampType:** MSD Units µg/L RPD Limit 20

SampID: 13040247-001CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cadmium	4.00		**61.8**	50.0	12.6	98.4	62	0.32	04/05/2013
Calcium	100	S	**324000**	1200	327800	-316.7	327000	0.92	04/05/2013
Magnesium	20.0	S	**76600**	750	76980	-56.0	76760	0.26	04/05/2013
Zinc	20.0	S	**19300**	500	19212	14.8	19368	0.42	04/05/2013

STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA

Batch 87056 **SampType:** MBLK Units µg/L

SampID: MBLK-87056

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**< 2.00**	2.00	0	0	-100	100	04/07/2013

Client: Barr Engineering Company

Client Project: Rivermines NPDES

Work Order: 13040247

Report Date: 15-Apr-13

STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA

Batch 87056 **SampType:** LCS Units µg/L

SampID: LCS-87056

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**16.6**	15.0	0	110.6	85	115	04/07/2013

Batch 87056 **SampType:** MS Units µg/L

SampID: 13040247-002CMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**17.5**	15.0	0.8925	110.4	70	130	04/07/2013

Batch 87056 **SampType:** MSD Units µg/L RPD Limit **20**

SampID: 13040247-002CMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lead	2.00		**17.8**	15.0	0.8925	112.9	17.4574	2.14	04/07/2013

STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)

Batch 87062 **SampType:** MBLK Units µg/L

SampID: MBLK-87062

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**< 2.00**	2.00	0	0	-100	100	04/07/2013

Batch 87062 **SampType:** LCS Units µg/L

SampID: LCS-87062

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**13.9**	15.0	0	92.6	85	115	04/07/2013

Batch 87062 **SampType:** MS Units µg/L

SampID: 13040247-001DMS

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lead	2.00		**15.5**	15.0	2.8691	84.2	70	130	04/07/2013

Batch 87062 **SampType:** MSD Units µg/L RPD Limit **20**

SampID: 13040247-001DMSD

Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lead	2.00		**15.7**	15.0	2.8691	85.3	15.5062	0.99	04/07/2013

Teklab Inc.
Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Barr Engineering Company
Work Order: 13040247
Client Project: Rivermines NPDES
Report Date: 15-Apr-13

Carrier: Tim Mathis
Received By: EEP

Completed by: Timothy W. Mathis
On: 04-Apr-13

Reviewed by: Michael L. Austin
On: 04-Apr-13

Pages to follow: Chain of custody 1 Extra pages included 0

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐		Temp °C	1.8	
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐		Dry Ice	☐	
Chain of custody present?	Yes ☑	No ☐					
Chain of custody signed when relinquished and received?	Yes ☑	No ☐					
Chain of custody agrees with sample labels?	Yes ☑	No ☐					
Samples in proper container/bottle?	Yes ☑	No ☐					
Sample containers intact?	Yes ☑	No ☐					
Sufficient sample volume for indicated test?	Yes ☑	No ☐					
All samples received within holding time?	Yes ☑	No ☐					
Reported field parameters measured:	Field ☐	Lab ☑	NA ☐				
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐					

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials	☑
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers	☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐		
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA	☑

Any No responses must be detailed below or on the COC.

Custody seal(s) intact on shipping container/cooler. TWM 4/4/13

13040247

Chain of Custody

BARR
1001 Diamond Ridge, Suite 1100
Jefferson City, MO 65109
(573) 638-5000

Teklab, Inc.
Courier Pick Up

Project Number: 25860009.00 TLM 021

Project Name: Rivermines NPDES

Sample Origination State: MO (use two letter postal state abbreviation)

COC Number: RMP 040313

COC 1 of 1

Project Manager: Ty Morris

Project QC Contact: Andrea Nord

Sampled By: Stephen Moilanen

Laboratory: Teklab

Location	Start Depth	Stop Depth	Depth Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix: Water	Matrix: Soil		Type: Grab	Type: Comp	Type: QC	Parameters: Water: pH	Total Suspended Solids	Sulfate	Settleable Solids	Total Organic Carbon	Total Metals	Dissolved Metals	Hardness			Parameters: Soil: VOCs (tared MeOH) #1	GRO, BTE (tared MeOH) #1	DRO (tared unpreserved)	Metals (unpreserved)	SVOCs (unpreserved) #2	% Solids (plastic vial, unpres.)			Total Number of Containers	
1. RM-001 13040247-		001		04/03/13	12:05	X			X			X	X	X	X	X	X	X	X										5	Preservatives: 2 HNO3, 1 H2SO4, 2 Unpreserved
2. RM-US		002		04/03/13	13:00	X			X			X	X	X		X	X	X	X										5	Preservatives: 2 HNO3, 1 H2SO4, 2 Unpreserved
3. RM-DS		003		04/03/13	11:40	X			X			X	X	X		X	X	X	X										5	Preservatives: 2 HNO3, 1 H2SO4, 2 Unpreserved
4. RM-DUP		004		04/03/13	--:--	X			X			X	X	X		X	X	X	X										5	Preservatives: 2 HNO3, 1 H2SO4, 2 Unpreserved
5.																														
6.																														
7.																														
8.																														

Comments: Invoice to Mark Nations at Doe Run. Results to be sent to Allison Olds (aolds@barr.com) at Barr Engineering, Andrea Nord (anord@barr.com) at Barr Engineering, and Mark Nations (mnations@doerun.com) at Doe Run.
Matrix is surface water.
Metals include Cadmium, Lead, and Zinc.

Common Parameter/Container – Preservation Key

#1 – Volatile Organics = BTEX, GRO, TPH, 8260 Full List
#2 – Semivolatile Organics = PAHs, PCP, Dioxins, 8270 Full List, Herbicide/Pesticide, PCBs
#3 – General = pH, Chloride, Fluoride, Alkalinity, TSS, TDS, TS, Sulfate
#4 – Nutrients = COD, TOC, Phenols, Ammonia Nitrogen, TKN

Relinquished By: Stephen Moilanen	On Ice? ☑Y ☐N	Date: 4-3-13	Time: 16:00	Received by:	Date: 4.4.13	Time: 0630
Relinquished By:	On Ice? ☐Y ☐N	Date: 4/4/13	Time: 0800	Received by:	Date: 4/4/13	Time: 08:00

Samples Shipped VIA: ☐Air Freight ☐Federal Express ☐Sampler ☒Other: Courier Pick Up
1.0 Regs V TM 4.4.13

Air Bill Number:
Custody Seal Intact TM 4.4.13

Distribution: White – Original Accompanies Shipment to Lab; Yellow – Field Copy; Pink – Lab Coordinator

#4

C:\Users\sbm\Desktop\Doe Run Chains\Chain of Custody RM Permit.doc